MITSUBISHI ELECTRIC

TRANSISTORIZED INVERTER

-INSTRUCTION MANUAL-

RELAY OUTPUT

FR-A5AR

Thank you for choosing the Mitsubishi transistorized inverter option unit.
This instruction manual gives handling information and precautions for use of this equipment. Incorrect handling might cause an unexpected fault. Before using the equipment, please read this manual carefully to use the equipment to its optimum.
Please forward this manual to the end user.

This section is specifically about safety matters

Do not attempt to install, operate, maintain or inspect this product until you have read through this instruction manual and appended documents carefully and can use the equipment correctly. Do not use this product until you have a full knowledge of the equipment, safety information and instructions.
In this instruction manual, the safety instruction levels are classified into "WARNING" and "CAUTION".

⚠ **WARNING**	**Assumes that incorrect handling may cause hazardous conditions, resulting in death or severe injury.**
⚠ **CAUTION**	**Assumes that incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause physical damage only.**

Note that the CAUTION level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.

SAFETY INSTRUCTIONS

1. Electric Shock Prevention

⚠ WARNING

- **While power is on or when the inverter is running, do not open the front cover. You may get an electric shock.**
- **Do not run the inverter with the front cover removed. Otherwise, you may access the exposed high-voltage terminals and charging part and get an electric shock.**
- **If power is off, do not remove the front cover except for wiring or periodic inspection. You may access the charged inverter circuits and get an electric shock.**
- **Before starting wiring or inspection, switch power off, wait for more than 10 minutes, and check for no residual voltage with a tester or the like.**

⚠ WARNING

- Any person who is involved in the wiring or inspection of this equipment should be fully competent to do the work.
- Always install the option unit before wiring. Otherwise, you may get an electric shock or be injured.
- Handle this option unit with dry hands to prevent an electric shock.
- Do not subject the cables to scratches, excessive stress, heavy loads or pinching. Otherwise, you may get an electric shock.

2. Injury Prevention

⚠ CAUTION

- Apply only the voltage specified in the instruction manual to each terminal to prevent burst, damage, etc.
- Ensure that the cables are connected to the correct terminals. Otherwise, burst, damage, etc. may occur.
- Always make sure that polarity is correct to prevent burst, damage, etc.
- While power is on or for some time after power-off, do not touch the inverter as it is hot and you may get burnt.

3. Additional instructions

Also note the following points to prevent an accidental failure, injury, electric shock, etc.:

(1) Transportation and mounting

⚠ CAUTION

- Do not install or operate the option unit if it is damaged or has parts missing.
- Do not stand or rest heavy objects on the product.
- Check that the mounting orientation is correct.
- Prevent screws, metal fragments or other conductive bodies or oil or other flammable substance from entering the inverter.

(2) Test operation and adjustment

⚠ CAUTION

- Before starting operation, confirm and adjust the parameters. A failure to do so may cause some machines to make unexpected motions.

(3) Usage

⚠ WARNING
● Do not modify the equipment.

⚠ CAUTION
● When parameter clear or all parameter clear is performed, each parameter returns to the factory setting. Re-set the required parameters before starting operation. ● For prevention of damage due to static electricity, touch nearby metal before touching this product to eliminate static electricity from your body.

(4) Maintenance, inspection and parts replacement

⚠ CAUTION
● Do not test the equipment with a megger (measure insulation resistance).

(5) Disposal

⚠ CAUTION
● Treat as industrial waste.

(6) General instruction

All illustrations given in this manual may have been drawn with covers or safety guards removed to provide in-depth description. Before starting operation of the product, always return the covers and guards into original positions as specified and operate the equipment in accordance with the manual.

CONTENTS

1.PRE-OPERATION INSTRUCTIONS

1.1 Unpacking and Product Confirmation

Take the option unit out of the package, check the unit name, and confirm that the product is as you ordered and intact.
Functions arailable differ between FR-A500(L)/F500(L) series and FR-V500 series, always check before using.

- SERIAL number check
  This product may be used with the FR-A520-0.4K to 22K manufactured in and after July 1997. Any of the models may be used with this unit if its SERIAL number indicated on the rating plate and package has "J77○○○○○○" or later version.
  SERIAL is made up of 1 version symbol and 8 numeric characters indicating year, month, and control number as shown below.

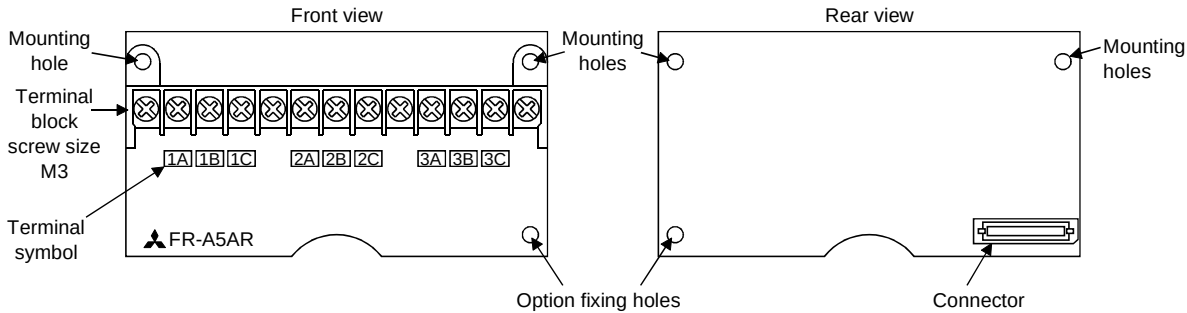
J	7	7	○○○○○○
Symbol	Year	Month	Control number
SERIAL number			

1.2 Packing Confirmation

Make sure that the package includes the following

- Instruction manual.....1
- Mounting screws M3 × 10 2

1.3 Structure



2.INSTALLATION

2.1 Pre-Installation Instructions

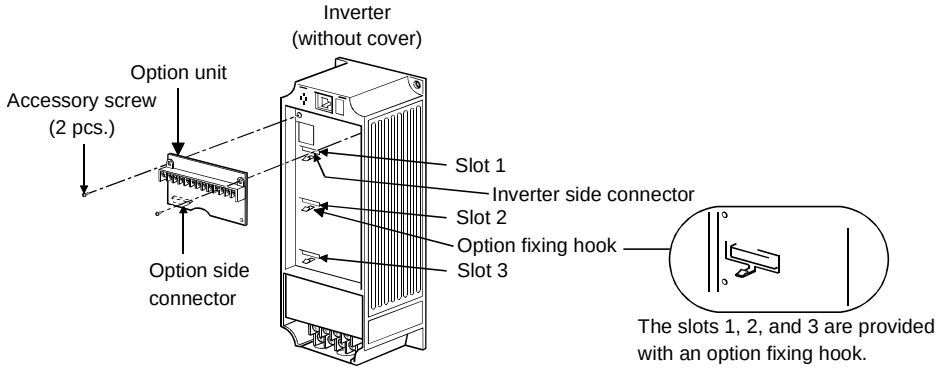
Make sure that the input power of the inverter is off.

⚠ CAUTION
⚠ **With input power on, do not install or remove the option unit. Otherwise, the inverter and option unit may be damaged.**

2.2 Installation Procedure

(1) Securely insert the connector of the option unit far into the connector of the inverter. At this time, fit the option fixing holes snugly. For the position of slot, refer to the next page.
Also be sure to fit the unit into the option fixing hook (For the FR-A500(L)/ FR-F500(L) series, it is available in Aug., 2000).

(2) Securely fix the option unit to the inverter on both sides with the accessory mounting screws. If the screw holes do not match, the connector may not have been plugged snugly. Check for loose plugging.



CAUTION

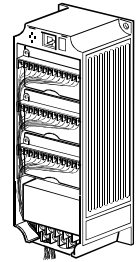
1. **Only one type of option per inverter may be used. When two or more options are mounted, priority is in order of slots 1, 2 and 3, the options having lower priority are inoperative.**
2. **When the inverter cannot recognize that the option is mounted, it displays the option error. The errors shown differ according to the mounting slots 1, 2, 3.**

Mounting Position	Error Display
Slot 1	E.OP1
Slot 2	E.OP2
Slot 3	E.OP3

2.3 Wiring

Route the wires so that they do not take up a lot of space in the control circuit terminal block of the option unit. During wiring, do not leave wire off-cuts in the inverter. They may cause a fault, failure or malfunction. Use the space on the left side of the control circuit terminal unit to route the wires.

Cable routing



REMARKS

The wires with large gaze may not be connected to the terminal block. When connected in parallel, all wires may not fit in the wiring space due to the increased number of wires. In such cases, perform wiring by using a junction terminal block.

⚠ CAUTION

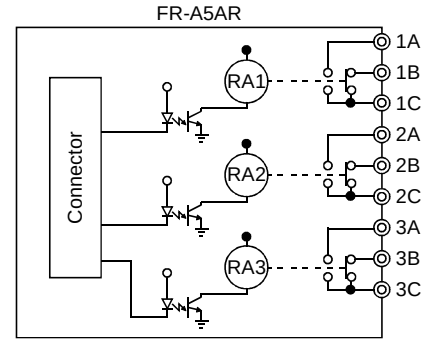
⚠ **Do not use empty terminals as junction terminals because they are used in the option unit. If they are used as the junction terminals, the option unit may be damaged.**

⚠ **When installing the inverter front cover, the cables to the inverter's control circuit terminals and option terminals should be routed properly in the wiring space to prevent them from being caught between the inverter and its cover.**

3.FUNCTIONS

3.1 Internal Block Diagram

You can select any three output signals available with an inverter as standard, and output them as relay contant signals.
Functions arailable differ between FR-A500(L)/F500(L) series and FR-V500 series.
The output signals to be selected differ according to the inverter. Refer to the instruction manual of the inverter. (output terminal function selection (Pr. 190 to))



Internal circuit diagram

3.2 Terminals

Terminal Symbol	Description	Terminal Symbol	Description
1A	Relay RA1's normally open contact terminal	2C	Relay RA2's contact common terminal
1B	Relay RA1's normally closed contact terminal	3A	Relay RA3's normally open contact terminal
1C	Relay RA1's contact common terminal	3B	Relay RA3's normally closed contact terminal
2A	Relay RA2's normally open contact terminal	3C	Relay RA3's contact common terminal
2B	Relay RA2's normally closed contact terminal		

* The operation of each relay depends on the output signal selected.

4.PARAMETERS

4.1 Parameter List

By installing this option unit, the parameters below are extended.
Set the values according to need.

Parameter Number	Name	Setting Range	Factory Setting
320	RA1 output selection	0 to 99, 9999	0
321	RA2 output selection	0 to 99, 9999	1
322	RA3 output selection	0 to 99, 9999	2

The setting value of the parameter differs according to the inverter. Please refer to the inverter instruction manual (output terminal function selection (Pr. 190 to)). (The setting value of negative logic can not be set.)

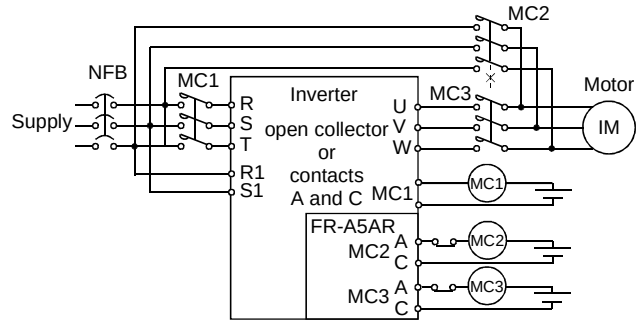
REMAKS

For Pr.320 to Pr.322, write is disabled during operation even when “2” is set in Pr.77. When changing the parameter setting, stop the operation.

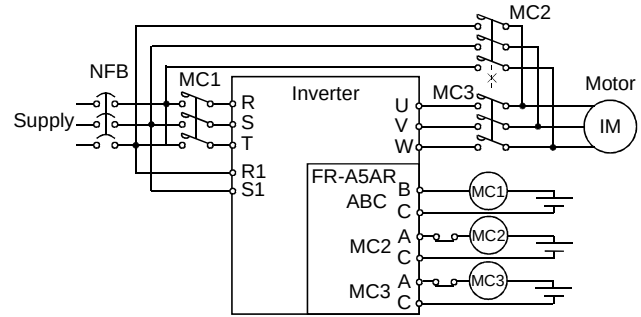
5.THE COMMERCIAL POWER SUPPLY-INVERTER SWITCH-OVER SEQUENCE FUNCTION

If the commercial power supply-inverter switch-over sequence function is activated with the FR-A5AR mounted on the inverter, the phenomenon where magnet contactor switches alternate between ON and OFF may occur. To prevent this, adapt either connection shown below.

(1) Recommended connection example 1
Use inverter output terminals (Contact signal, open collector signal) instead of MG1 signals.
The phenomenon occurs when relay output of the FR-A5AR is used as MC1 signal.



(2) Recommended connection example 2
When using relay output of the FR-A5AR, set the alarm output signal (ABC) instead of the MC1 signal and output it from contacts B and C.



CAUTION

For the FR-V500 series, the commercial power supply-inverter switch-over sequence function can not be used.

6.SPECIFICATIONS

6.1 Specifications

(1) Output signal type: contact output (three relays mounted)

(2) Contact output: 230VAC 0.3A
30VDC 0.3A

CAUTION

The contacts should be used within the rated capacity to ensure long contact life.

REVISIONS

*The manual number is given on the bottom left of the back cover.

Print Date	*Manual Number	Revision
Sep., 1997	IB(NA)-66810-A	First edition
Jan., 2002	IB(NA)-66810-B	Addition Adaptable inverters